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(54) ULTRAVIOLET-CURABLE CATIONIC ELECTRODEPOSITION COATING COMPOSITION SUITABLE FOR PLATED MATERIAL

(57)Abstract:

PURPOSE: To obtain an electrodeposition coating composition which is applicable to not only ordinary metals but also plated plastic or die-cast-metal articles, is rich in adhesion and flexibility, and imparts excellent anticorrosion by incorporating a polyfunctional acrylate and a specific resin capable of undergoing cationic electrodeposition as the active ingredients

CONSTITUTION: This composition contains, as the active ingredients, 10-70, excluding 70, pts.wt. polyfunctional acrylate having three or more acryloyl groups per molecule and 30-90, excluding 90, pts.wt. resin which is capable of being cationically electrodeposited and has an average mol.wt. of 2,000-30,000. The resin is a copolymer of 1-20, excluding 20, pts.wt. vinyl monomer having a tertiary amino group and 80-99, excluding 99, pts.wt. at least one member selected from among hydroxyesters of α,β -unsaturated ethylenic monocarboxylic acids, alkyl esters of α,β -unsaturated ethylenic monocarboxylic acids, and α,β -unsaturated ethylenic compounds.

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. *** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The ultraviolet curing mold cation electrodeposition paint constituent suitable for the plating material characterized by containing under 90 weight sections for the resin of the average molecular weight 2,000-30,000 which has cation electrodeposition nature for the polyfunctional acrylate which has three or more acryloyl radicals in a molecule under 70 weight sections more than 10 weight sections as an active principle more than 30 weight sections.

[Claim 2] The resin which has said cation electrodeposition nature following (a) more than 1 weight section Under 20 weight sections Or (b-2) (b-3) it is a copolymerization object more than the under 99 weight sections 80 weight section about one sort or two sorts or more of mixture. the following (b-1) — The ultraviolet curing mold cation electrodeposition paint constituent suitable for the plating material according to claim 1 characterized by for the average molecular weight being 3,000-30,000, and being resin which has the 3rd class amino group in the side chain of the copolymerization object.

(a) The 3rd class amino-group content vinyl monomer (b-1) alpha, beta-ethylene nature partial saturation monocarboxylic acid hydroxy ester (b-2) alpha, beta-ethylene nature partial saturation monocarboxylic acid alkyl ester (b-3) alpha, beta-ethylene nature unsaturated compound [claim 3] The resin which has said cation electrodeposition nature is [Formula 1] in a polymer.

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R

However, R is an ultraviolet curing mold cation electrodeposition paint constituent suitable for the plating material according to claim 1 characterized by being polyurethane of the average molecular weight 2,000-10,000 containing the 3rd class amino group shown by the with a carbon number of four or less alkyl group.

[Claim 4] Said electrodeposition paint constituent is an ultraviolet curing mold cation electrodeposition paint constituent suitable for claim 1 characterized by including a coating, pigments, or those mixture below 20 weight sections thru/or a plating material given in three if needed.

[Translation done.]

example, this invention is not limited to this.

[0043] Example 1 (1-A) agitator, a condenser, a thermometer, and a tap funnel in the 4 opening flask with which each opening was equipped Telling (hexamethylene diisocyanate, Diisocyanate JIRAU rate 0.48g which has a catalyst in acrylate-2-hydroxyethyl 116g while teaching and agitating xylene 135g. The mixed liquor which added METOKINON 0.1g as a polymerization agent was dropped at uniform velocity for 10 minutes from the top funnel. Churning was continued for 50 minutes, holding at 40 more degrees C or less, and the acrylate solution made into the purpose was obtained. In addition, when absorption of 2270nm-1 disappeared with the infrared absorption spectrum, it checked that the isocyanate radical had reacted completely.

[0044] (a) dimethylaminooxyl methacrylate 40g, methoxybis-2-hydroxyethyl 100g, and acrylate-2-hydroxyethyl 90g, (1-B) 50g of n-butyl methacrylate, 145g of methyl methacrylate, and styrene (b-3) 75g are added to isopropyl alcohol 500g as a solvent. Further as a polymerization initiator The mixed liquor which added 10g for 2 and 2-methyl isobutyl nitro is taught to the 4 opening flask which equipped each opening with the agitator etc. the (1-A). The temperature up was carried out agitating, the takes doses of the mixed liquor of the still more nearly same presentation were dropped at homogeneously from the top funnel in 90 minutes after flux initiation, it held at 85 degrees C for further 4 hours, churning was continued, and the resin solution which has the cation electrodeposition nature which is these copolymers was obtained. It checked by GPC that the average molecular weight of this copolymer was 26,000.

[0041] (1-C) After adding 2-hydroxy-2-methylpropiophenone 1g as 71.4g of acrylate solutions obtained while adding 1.5g of lacto acids to 9g of obtained copolymer solutions, neutralizing and agitating (1-A), and a photopolymerization initiator, in addition, the ultraviolet curing mold cation electrodeposition paint constituent of this invention was obtained, having used the whole quantity as 1L, agitating ion exchange water (1-B).

[0042] OPF-Resin T-1 (trade name, product made from Okumura Oil M3030g which is commercial acrylate of three or more organic functions while adding 2.7g of lacto acids to 127g of copolymer solutions obtained in the example 2 (b-C) (1-B), neutralizing and agitating. After adding 2-hydroxy-2-methylpropiophenone 1g as a photopolymerization initiator, in addition, the ultraviolet curing mold cation electrodeposition paint constituent of this invention was obtained, having used the whole quantity as 1L, agitating ion exchange water.

[0043] The liquid which dissolved isocyanate diisocyanate 108.7g contained in an example 3 (b-B) (c-2) in xylene 75.8g is taught to the 4 opening flask which equipped each opening with the agitator etc. Res (1-A). The solution which dissolved PLACGEL205 (trade name, Daisel Chemical Industries, Ltd. make) 220.7g contained in (c-2) of methacrylate and N-methyldiethanolamine 24.4g contained in (c-1) in xylene 75g was dropped in 30 minutes from the top funnel, agitating. Temperature was held at 40 degrees C or less, churning was continued to the pan for 120 minutes, and the polyurethane solution which has the 3rd class amino group was obtained. In addition, when absorption of 2270nm-1 disappeared from the infrared absorption spectrum, it checked that the isocyanate radical had reacted completely.

[0044] (b-C) After adding 2-hydroxy-2-methylpropiophenone 1g as OPF-Resin T-15Dg which is commercial acrylate, and a photopolymerization initiator, having added and neutralized 2.2g of lacto acids, and agitating 71.4g of polyurethane solutions containing the obtained 3rd class amino group, in addition, the ultraviolet curing mold cation electrodeposition paint constituent of this invention was obtained, having used the whole quantity as 1L, agitating ion exchange water (3-B).

[0045] After carried out electroplating of the ultraviolet curing mold cation electrodeposition paint constituent obtained in said examples 1-3 to the test piece (5mmx5mm) which performed nickel plating to ABS plastic by 10 micrometers of thickness by the approach used conventionally and 80 degrees C dried for 10 minutes, ultraviolet rays were irradiated for 2 minutes in the distance of 20cm with the UV oven (60W high pressure mercury vapor lamp) by the eye graphic company. [0046] which shows the result of an evaluation trial of the completed paint film in Table 1 with the result of the example of a comparison by this (Table 1)

試 験 項 目	実施例 1	実施例 2	実施例 3	比較例
外 観	○	○	○	△
粘 着 性	100/100	100/100	100/100	0/100
硬 度	2 H	3 H	2 H	4 H
170° 折曲テスト	△	○	○	×
C A S 7 2hrs	○	○	○	○
アセトン Rub	50-10	200+	200+	200+
耐沸騰水 5hrs	○	○	○	○
5%NaOH 48hrs	部分白化	○	○	○
5%硫酸 48hrs	○	○	○	○

[0047] The test method is as follows.

[0048] Besides it sees, it is based on viewing. Irregularity was accepted only for the example of a comparison for a white.

[0049] Adhesion Cross cut adhesion test JIS K 5651 ** Whenever Mizubishi Pencil Uni 160 degree folding test of 1kg loads 190 degrees of test pieces are bent. A cellophane tape is made to adhere to a field. A peel test. O mark exfoliation nothing, x mark complete avulsion, ** mark — partial — exfoliation CASS72hrs JIS K 5617 Following O mark Normal thing acetone Rubs A. The load is applied to the cloth immersed in the acetone. A test piece top is made to reattach. Count of round trip ballproof 5hrs until a base is exposed to hot water 80 degrees C or more, the appearance after 5-hour immersion it is judgment 5%NaOH48hrs by viewing. It is visual judgment 5% sulfuric acid 48hrs about the appearance after 40-hour immersion at 25 degrees C to 5%NaOH water solution. In the uridine surface solution which acquired the appearance after 48-hour immersion visually at 20 degrees C. In the sulfuric acid water solution 5% at (1-A) of the example example 1 of a judgment comparison. In addition, the ultraviolet curing mold coating constituent was obtained, having added the xylene further and having used the whole quantity as 1L, agitating 2-hydroxy-2-methylpropiophenone 1g as a photopolymerization initiator. By being immersed twice in the same test piece so having used this in the example for 5 seconds, paint film formation was performed and desiccation and an exposure were performed on the same conditions as examples 1-3. The same evaluation trial as an example was performed to this.

[0050]

[Effect of the Invention] It hardens by irradiating ultraviolet rays in ordinary temperature according to this invention as mentioned above, and a material and adhesion are good and the paint film suitable for the plating product has the anti-corrosiveness and transparency which were rich and excellent in flexibility, and made from good plastic and the die casting of an appearance can be obtained.

[Transition done.]